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Annual technical report
6/1/92-5/31/94
Air Force grant no. F49620-92-J-0268
Prof. Nils Nilsson, Principal Investigator

Progress made by students supported under this award:

Roy: Not supported because focus of research irrelevant to parent project
(replaced with Harvey).

Holbrook: Not supported because changed from AI to systems (replaced with
Menlove).

Geddis: Mr. Geddis has been investigating the use of caching as a mechanism for
the control of reasoning. Ideally, one would like to be able to cache both
successful and failing subgoals, and then retrieve these answers should the
subgoal reappear in the proof tree. This idea is quite difficult to make
complete, however, because the appearance of goal-goal resolutions in proof
search spaces means that the answer to a particular cached query may be
dependent not only on the query but on its position in the search space. Mr.
Geddis has shown that in a wide variety of cases, the correctness of the
overall algorithm is independent of this difficulty. This work forms the core
of his Ph.D. dissertation, which he is expected to finish in late 1994.

Harvey: Mr. Harvey has developed two new techniques for searching large spaces.
ITERATIVE BROADENING is an idea that applies to systematic search and an
article describing it has appeared in the AI Journal. MULTIPROBE is a novel
nonsystematic search technique that has performed very well in preliminary
experiments on scheduling problems. He is expected to receive his Ph.D. in mid
1995.

Menlove: Mr. Menlove is a Master's student who was supported by this award
during the final year of his master's program. He ported the graphical
interface to the MVL system to CLIM, the Common Lisp Interface Manager. MVL's
graphical interface has been central in helping us to understand the control
issues arising in real-time and anytime planning and reasoning, and this
understanding has been key in the development of the 'approximate planning'
paradigm.

Darwiche: Dr. Darwiche completed his thesis work in 1993. The work, supported
by this AASERT award, involved the development of a symbolic generalization of
probability theory. This generalization retains the desirable computational
properties of probabilistic methods, and Darwiche used it to construct a
generalization of Bayes networks that could be applied to first-order logic,
nonmonotonic reasoning and assumption-based truth maintenance systems.

Jonsson: Mr. Jonsson has been involved with the experimental evaluation of
competing search methodologies. He has conducted experiments in a variety of
domains including scheduling, and the results were reported at a AAAI Spring
Symposium on AI & NP-Hard problems in 1993.